

Application No. 10/082,771
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REMARKS

Preliminary Matters

Claims 1-42 are presented for reconsideration.

Rejections Under 35 U.S.C. § 103

Claims 1-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Miller, U.S. Patent No. 6,067,288. Applicant respectfully traverses this rejection.

The Examiner asserts that Miller discloses a method of monitoring performance of two communications channels. Miller discloses a data acquisition library 11 (Fig. 2), which can be located in a unit controller and presumably at least replicated so as to monitor two channels from one or more application cards (col. 8; lines 24-26). The Examiner concedes that unlike the invention, Miller does not teach an application of his method to a protection-switching configuration, but nevertheless asserts that Miller's disclosure could be applied to such a configuration. Miller provides no enabling details on how to accomplish this. For example, it cannot be determined whether one data acquisition library 11 could be attached to a plurality of channels, or whether a plurality of data acquisition libraries would be needed, one for each channel.

However, even if this could be done, Applicant's claimed invention has an important advantage over the technique disclosed in Miller. The arrangement and method claimed in independent claims 1, 9 and other claims herein include an active counter for PM data that is switchably connected to either a primary channel or a secondary channel responsively to protection switchovers. Consequently, in each monitoring interval, this counter can be queried to obtain global

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performance measurements transparently to any number of protection switchovers that may have occurred during the interval, e.g., to verify that a customer's performance specifications have been met, without need for analysis of protection switchovers. This is not possible using the disclosed system of Miller. Miller's method would require collecting the records of stored "events" for each separate line or channel that may have been related to a protection switchover. Furthermore, the differences between the arrangement disclosed in Miller and the claimed invention are far from trivial.

Miller's data acquisition library 11 is said to be flexible, relying on strict interface definitions (col. 8; lines 1-41). The Examiner, in discussing claims 27 and 35 at page 6 of the Official Action takes the position that the data acquisition library 11 contains inherent switches and a sufficient number of counters to meet the requirements of claims 27 and 35, and could be reconfigured, e.g., rewired or reprogrammed so as to be transformed into the claimed arrangement, and that it would be obvious to do so. Applicant respectfully disagrees with this conclusion. Miller provides no guidance on how to convert the data acquisition library 11 into a performance monitor suitable for a protection switched network, as it is principally directed to satisfying delay requirements of the SONET standard. It is only by viewing the invention retrospectively, which the patent laws do not allow, that it becomes apparent that one might attempt to transform the arrangement of Miller into the claimed arrangement, and again the rearrangement is far from trivial.

Applicant further urges that the general motivation in Miller, expressed as a need for competent performance monitoring in telecommunications (col. 1; lines 50-68), and relied on by the Examiner, is not an adequate suggestion to pursue a line of invention leading from the disclosure in Miller toward the claimed invention. Such a basis for motivation is so general that, according to the

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logic asserted by the Examiner, it would seemingly support the transposition of Miller's disclosure into any communication configuration whatsoever.

The motivation of the Miller invention teaches away from Applicant's invention in that Miller's system is designed to utilize event-based signals in a series of time-dependent, delay-queuing operations that determine when to swap a "previous" accumulation bank for a "current" bank, thus allowing the current bank to be regularly emptied and reset. Miller's object is "efficiently lowering the overhead on meeting the SONET standard for discarding several seconds of generated PM data under certain prescribed circumstances in a manner which does not slow performance, increase RAM and CPU consumption or create design complexity." (column 5 lines 42-47). Miller's system gains efficiency by not retaining large amounts of PM data, and particularly it does not accumulate PM data for the second "controlling" channel into the accumulator. However, this creates a problem in a protection-switched network of certain configurations, where this said second channel can be used as an active transmission channel, whereupon immediate switching to accumulate PM data for that channel in combination with the previous sequence of that transmission on the prior channel is important. Applicant's invention elegantly solves this problem with a design that is very different from Miller's teaching.

Examiner has argued that "monitoring first and second transmission line channels" taught by Miller (at column 5 lines 54-65) is well known in the art to "predict the onset of failures" and to "execute steps toward preventative or remedial maintenance of the equipment," thereby suggesting its applicability to protection-switching configurations. To the contrary, Applicant respectfully argues that a technique designed to sporadically collect and store "events" or "primitives" in order to predict the onset of failures and to execute steps toward preventative or remedial maintenance

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would be in no way suggestive of a distinct method that switchably and continuously maintains a global record of performance monitoring data throughout instantaneous and automatic protection switchover of signal transmissions to a protection line.

It is important to realize that Applicant's invention focuses on maintaining accumulation of PM data following a "switchover", whereas Miller's invention is concerned with accumulating PM data related to other specifically defined "events." "Switchovers" are not equivalent to "events" as defined by Miller. Examiner argues that "detecting a switchover" and "to detect events" are essentially the same (see page 2 of Office Action, referring to Applicant's Claim 1 and to Miller at column 5 lines 54-65, respectively); however, it is explicitly stated in Miller at column 9 lines 17-23 that:

"As part of this general surveillance activity the AC 3 may, in certain situations, take corrective action in response to certain activities. However, if corrective action is not called for and the activities occur for the time span of a second, the AC 3 may report the second as a severely errored second, thereby creating an event. In response to this event, the AC 3 can generate a PM signal ..."

Miller further explicitly defines an "event" as follows:

"An event is a defect, failure or anomaly in transmission which causes the occurrence of a severely errored (sic) second or a spontaneous condition." (at column 2 lines 8-10)

Thus, a switchover that is caused by software signalling would come later than an "event", while a switchover that is considered to be an automated corrective action would come prior to and might even prevent the creation of a Miller "event" (in that a second's duration of activities has not occurred to lead to the application card (AC) creating an "event").

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This is fundamental to the Miller disclosure. Miller's method accumulates PM signals in a first "controlled" delay module from "events" detected in a first transmission line channel, and then records those signals in an accumulator based on signals received in the "controlling" second transmission line channel. Applicant's invention, on the other hand, is concerned with and responsive to switchovers, which are clearly distinct from Applicant's "primitives" (see Applicant's Specification at page 5 lines 21-32) or Miller's "events." Applicant's "primitives" are essentially similar "anomalies or defects" that correspond to Miller's definition of "events." Switchovers, however, may result directly from network hardware or software responding to problems in transmission, or indirectly from secondary signals triggered by "events" or "primitives", or from other switching decisions implemented by the software. A switchover need not be caused by a Miller-defined "event" (i.e., by a defect, failure or anomaly), e.g., a switchover could stem from a cyclic, regularly timed, or otherwise controller-induced action. Similarly, "events" could occur that would trigger responses in Miller's PM data accumulation operations without a protection-switchover ever having occurred.

Further, Miller teaches away from the inventive concept of accumulating data from different sources in a single counter. Fig. 3 of Miller, cited by the Examiner, shows a bank switched arrangement in the data acquisition library 11, wherein one bank 20 accumulates data associated with a current monitoring interval and another bank 22 contains data associated with a previous monitoring interval. Obtaining a global picture from two sources would require both banks to be

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analyzed, while the claimed arrangement only requires evaluation of one counter. Independent claims 9, 16, 22, 27, and 35 all recite a third counter that alternately accumulates data from two different channels, a structural feature which is not disclosed in Miller. Examiner further asserts (Office Action, page 6) that "inherent in the data acquisition library" is Miller's teaching of "a switch for associating said third counter with one of said first port and said second port [...], said third counter accumulating one of said first data and said second data responsive to said switch." Applicant respectfully disagrees.

In a two-wire, protection-switched network, Miller's data acquisition library cannot accumulate in a third counter PM data from a second transmission line which has just received the transmission signal, because there is no third counter. By Miller's disclosure in Figures 1 and 2, a two wire network would have two Application Cards (AC) organized under one unit controller (UC). Miller states that "the data acquisition library 11 is located in the AC or in the UC." One data acquisition library contains a single additive accumulation module (numeral 19 in Miller's Figure 3). Therefore, in a two-wire configuration, Miller's system could have either one additive accumulation module in the UC, or two additive accumulation module in the two ACs connecting the two wires (one module in each AC). Thus, there can be no third counter.

In asserting that Miller discloses a third counter (Office Action, page 6), Examiner references numeral 21, 23, 25, 27, 29 in Miller's Figure 3. These numerals refer to five special-function modules that are part of the data acquisition library (DAL), being the maximum accumulation module 21, minimum accumulation module 23, gauge module 25, ratio module 27 and stopwatch module 29. Miller's disclosure lays out the role of each of these special-function modules (column 9 line 62 through column 11 line 12), and none of them is to serve as a counter. To the contrary, all

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these special-function modules perform comparative evaluation steps for the signals as they are being acquired as part of the decision cascade toward whether or not to swap current and previous data banks in the data acquisition library. Nothing in Miller's disclosure suggests that any of these modules can be used as an alternative or subsequent storage accumulator to Miller's first additive accumulation module 19. More particularly, nowhere in Miller's disclosure is there any suggestion to accumulate PM data for the said first or second transmission line channel in one of these five special-functioned modules for an ultimate purpose of collection, storage and analysis. Therefore, Miller fails to disclose a third counter.

On page 4 of Examiner's Action, regarding claims 9, 16 and 22, Examiner relies on Miller's disclosure at column 11 lines 13-33 for asserting that Miller teaches "detecting a switchover between said first communication channel and said second communication channel and thereafter accumulating said second performance data in said third counter". Applicant respectfully argues this is erroneous. At this portion of his disclosure Miller is disclosing a "stopwatch function" that upon detection of an "event" at step 903 sends a signal whereupon the stopwatch module determines, at step 905 whether a change of state has occurred. As argued above, a switchover occurring prior to event detection may not be detected as an "event" by Miller's method, because it curtails activities on the first transmission channel, and continuous activities for a time interval of a second are required as a basis for creating an "event" (column 9 lines 17-23). Further, a switchover that is caused by one of Miller's modules causing a response, i.e., stemming from event detection at step 903 in PM data module 29, could only occur after the event signal that is causative of step 905 occurs. Thus, a switchover can not be included as equivalent to Miller's "change of state." Further, without regard to resolving the distinction between "switchover" and "change of state", all that

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happens in stopwatch module 29 upon determination of a "change in state" is that the elapsed time is recorded. Nowhere in Miller's disclosure, and clearly not in this section relating to the stopwatch PM data module 29, does his method teach accumulating in a counter PM data from a first channel and thereafter accumulating into that counter PM data from the said second channel.

For the reasons argued above, i.e., that a "switchover" is equivalent neither to Miller's "event" nor to his "change of state", it must be considered that Miller's disclosure is silent as to "switchovers" and, therefore, regarding independent claim 1, Miller does not teach accumulating PM data from a first channel in an active counter, detecting a protection switchover between the channels, and thereafter accumulating PM data from another of the said channels in the active counter. (see Examiner's Action, page 1).

Finally, regarding Miller's use of the language "first and second PM signals in first and second delay modules" (e.g., col. 5; line 65 through col. 6; line 2), Miller uses the terms "master" and "slave" instead of "first" and "second". (col. 13; lines 51-63), which indicate a strong coupling between a master delay module and the slave delay module. Applicant's invention continuously accumulates first signals from a first line or second signals from a second line to a counter of similar functional relationship within the claimed performance monitoring system, and with substantial operational symmetry in the treatment of signals from the first and second lines. On the other hand, Miller's design only accumulates a portion of first signals from a "slave" first channel module based upon evaluating signals from the "master" second channel module, with the first channel signals and second channel signals treated differently in processing modules of dissimilar functional relationship within Miller's system and with substantial asymmetry in the treatment of the first and second signal operations. Specifically, in Miller's system two delay queues must be cleared if the

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master state machine is in the discard state. Such coupling between the channels is not found in Applicant's invention and in fact is contrary to the autonomous operation of the working and protection software counters in the claimed invention. Indeed, because of this inter-channel dependence, the system as disclosed in Miller would be unsuitable for performance monitoring of a protection-switched arrangement as claimed herein.

Applicant urges that the independent claims herein are all allowable for the reasons given above, and the dependent claims are all allowable as depending from an allowable claim.

Concluding Matters

It is believed that the remarks presented hereinabove are fully responsive to all the grounds of rejection and objections raised by the Examiner, and that the Application is now in order for allowance.

The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

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